



AN OVERVIEW OF INTERNATIONAL ENERGY AGENCY
DEMAND SIDE MANAGEMENT PROGRAM
TASK XIII: DEMAND RESPONSE RESOURCES

PREPARED FOR:

FEDERAL ENERGY REGULATORY COMMISSION'S
TECHNICAL CONFERENCE ON DEMAND RESPONSE AND ADVANCED METERING

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ABOUT RETX Energy Services, Inc.

(See www.retx.com for more information)

RETX was founded in January of 1999. RETX provides Internet applications and services for energy management and demand response opportunities. RETX's ePath Product Suite is designed to provide advanced and flexible tools to help reduce demand response program operating costs, improve grid reliability, and manage energy efficiency efforts. RETX's clients have included Independent System Operators, Load Serving Entities, and DR Aggregators.

More recently, RETX has contributed significant design and evaluation expertise to the International Energy Agency Demand Side Programme Task XIII. RETX CEO, Ross Malme, was recruited to become the Operating Agent for that effort because of his extensive DR background. Ross also is the immediate past chair of the Peak Load Management Alliance, the leading DR trade group. RETX staff members provide extensive support in research, analysis, and interpretation for these efforts.

About IEA DSM Programme

(See <http://dsm.iea.org/> for more information)

The IEA Demand-Side Management Programme is an international collaboration with 17 IEA Member countries and the European Commission, working to clarify and promote opportunities for demand-side management (DSM). For the purposes of this Programme, DSM is defined to include a variety of purposes such as load management, energy efficiency, strategic conservation and related activities. DSM is thus forming a "tool-box" for utilities and governments in their work to make energy systems more suited to their purpose. Further, the Programme is developed to cover such needs under different regulatory regimes and market structures since the basic need to ensure an optimal function of the energy system is common throughout the world. There have been many changes in the organization of the energy markets in the world and the DSM Programme has been accordingly adjusted to serve the actual and changing circumstances. The Programme and its Experts have thus achieved a profound knowledge and insight in the management of Energy Efficiency in modern contexts.

The IEA Demand Side Management Programme has for many years developed tools and delivered solutions so that the DSM concept can be used under different regulatory regimes, not the least of which is in liberalized markets. Through co-operative activities, participants will collaborate to help DSM technologies to reach their full market potential, thereby allowing energy systems to function more effectively and giving energy system investments enhanced value for gas and electricity customers. Thus, for whoever wants to develop or use demand side management activities or related policies and for whatever purposes, the IEA DSM Programme should be the natural first resource to consult to make use of experiences learned and to further develop DSM and Energy Efficiency tools.

About Task XIII

(See www.demandresponseresources.com for more information)

In April 2004, the International Energy Agency Demand Side Management Programme (IEA DSM) created a new annex called Task XIII: Demand Response Resources. Task XIII is charged with reviewing DRR practices in various markets around the world and developing recommendations and tools for integrating DRR into regular market activities.

The project participants are:

Australia	Canada	Denmark	Italy
Japan	Finland	Korea	Netherlands
Norway	Spain	Sweden	USA

The project is organized into the following Subtasks:

SUBTASK	STATUS
<p><u>SUBTASK 2</u> -- <i>Define the DR Resource Base and Market Characterization</i></p> <p>This will involve a market characterization of demand response products, services and enabling technologies. It would identify the market actors involved and the decisions that need to be made by market actors to effectively deploy DRR.</p>	<p>We surveyed the participating members to gather information on market structures, demographics, regulatory issues, and DR activities. From this information, we published the "Country Comparison Report".</p>
<p><u>SUBTASK 3</u> – <i>Market Potential of DRR</i></p> <p>This subtask will examine those factors that make DRR economic with specific application to participating countries. This effort will build on the results of subtask 2 and the best practices database to determine how much DRR would be economic within different markets and under different market conditions.</p>	<p>We issued a DR Market Potential report that established DR market potential benchmarks, modeling techniques, and consumer survey tools. The report was created based on a survey completed by the OA Team.</p> <p>In addition, we developed an Online DR Market Potential Calculator. With this tool, a user can input some basic market demographic information, and the tool will translate the DR market potential benchmarks to their market.</p>
<p><u>SUBTASK 4</u> – <i>Demand Response Valuation</i></p> <p>This task will develop the methods and procedures required to establish the value of DR and to administer them in each country to create a valuation framework to guide development initiatives. This value of DRR can be compared to the market potential developed in Subtask 3 to set initial targets for DRR within regions and countries.</p>	<p>We recently published two DR Valuation reports that proposes a methodology for estimating the net present value for DR. The methodology utilizes probabilistic modeling techniques to value the future impact DR can have in a liberalized market.</p>

<p><u><i>SUBTASK 5 – Role and Value of Enabling Technologies</i></u></p> <p>The focus of this task will be to develop a catalogue that describes the technologies and systems that are available for use in DR programs both from the perspective of the system operator and the participating customer. The value of technologies and systems of different applications will also be addressed.</p>	<p>We've collected DR Technology case studies (Subtask 5) from Australia, Denmark, Italy, Netherlands, and Norway. These case studies are organized into a database on the project portal. We are actively requesting more case studies from these participants as well as seeking initial efforts from the other participants. However, ExCo encouragement would be appreciated because our deadline has already past (mid-August 2005).</p>
<p><u><i>SUBTASK 6 – Characterize Priorities and Barriers, and develop Solutions and Recommendations</i></u></p> <p>The focus of this task will be to establish channels for communicating with each country's key decision makers, thought leaders and DR program administrators and implementers and utilize them to promote the development of DR resources.</p>	<p>We have created an Online DR Product Database. The database contains nearly 100 DR products from Australia, Denmark, Norway, Spain, Sweden, and USA. The online tool allows a user to search for specific products using selective search criteria.</p> <p>In addition, we have collected input from nearly all countries on some of the DR market barriers they encounter. This information will be built into a database and summarized when all the input is received.</p>
<p><u><i>SUBTASK 7 – Develop DRR Network of Methods, Tools and Applications</i></u></p> <p>This subtask will involve creating a web portal that will be a virtual center of excellence concerning regarding DRR methods, technologies, and applications.</p>	<p>As part of our Task communication plan the OA issues period project newsletters, hosts the project portal, coordinates DR workshops, and gives presentations on the project at industry conferences.</p> <p>We are also developing a ½ day DR training course based on the project output. The training course will help people understand how DR works and how to develop products.</p>
<p><u><i>SUBTASK 8 – Deliver Products and IP to IEA DSM Programme and Project Participants</i></u></p> <p>This subtask will focus on the delivery of the intellectual property created in the DRR Project to the IEA DSM Programme and the participating countries.</p>	<p>The OA Team continues to discuss and encourage the Country Experts to formulate in-country implementation plans.</p> <p>We are hoping to hold a conference in Paris during the Fall of 2006 for all Task XIII participants to share their experiences.</p>

Key International Demand Response Efforts

NORWAY:

The Norwegian System Operator, Statnett, must dispatch sufficient operating reserves to balance the system in real time. If generation cannot meet demand Statnett will be penalized financially if it must disconnect load to save the system.

Statnett needs a minimum of 2000 MW of fast operating reserve for the Norwegian Balancing Market. Due to the limited generation margin, there is a risk that all Norwegian generating capacity might be sold in the day-ahead Elspot market on winter week days both to cover Norwegian demand and to be exported. To comply with the Regulations, Statnett developed an options market to secure sufficient fast operating reserves in high demand periods. This Reserves Option Market was launched in 2000.

The Reserves Option Market secures sufficient regulating power for the Balancing Market. Statnett is purchasing the right (option) to dispatch regulating resources in generation as well as in demand. Both resources compete on equal terms. In the early phase, the contracts lasted 1-12 months.

The Reserves Option Market has resulted in a substantial volume of demand to compete with generation. A number of consumers have found it financially interesting to prepare for demand disconnection on short notice. Mainly big industrials have participated, though there is a potential for smaller demand to participate. Statnett is initiating pilot projects to arrange packages of smaller consumers and encouraging more consumers to bid demand disconnection in the day-ahead Elspot Market, especially in periods with high spot prices.

In addition to the weekly contracts in the Reserves Option Market, Statnett has entered into a few bilateral agreements of 5-10 years' duration with generators. The agreements have contributed to rehabilitation of old units and increased the size of units to be installed. At the same time Statnett has secured some of the operating reserves at an interesting cost. Additional agreements will be considered. More information is available at www.statnett.no.

AUSTRALIA:

Demand Response Resources are able to bid schedules into the NEM, but this option is rarely used because there are many rules to follow as a market participant to do so. Therefore, most DRR activity is currently provided by way of bilateral contracts between retail suppliers and the consumer. For example, some retailers monitor market prices and advise consumers of potential price spikes so that the consumer can load shed/shift. In 2004, NEMMCO estimated that the amount of "firm" demand response capacity was 157 MW in Queensland, 14 MW in NSW, and a total of 163 MW in remaining states. Additional "non-firm" capacity is available, but the numbers are not reported.

Australia has also conducted several paper trials to determine consumer and market behavior if more DRR participated in the wholesale market. The MCE is currently using

these and other experiences to help guide them in making changes to the policy framework that would facilitate demand side participation in the NEM.

DENMARK:

The system operator is conducting several demand response pilot projects currently in place. Some projects targeted load shedding/shifting residential and commercial electric heating and others allow larger consumers to bid their DR into the balancing markets. The most important pilots at present are:

EFFLOCOM: This project evaluates the methods and impacts of direct load control of electric heating based on RTP. Enabling technology include hourly metering, communication by GRPS as well as customer WEB interface. The system is designed for automatic activation when the Nord Pool hourly Elspot prices exceed preset levels. The system might also be used at the balancing market. The initial 25 household pilot proved successful and consumers were satisfied. It is planned to increase the participation to around 3-400 households in the near future. In case the activity was extended to around 65.000 households, it is estimated the peak could be reduced by up to 250 MW on a cold winter day.

Elkraft Tender: The eastern TSO allows consumers to sell demand response. They were offered a capacity payment of 200,000 DKK/MW-Year (\$35,000 USD / MW-Year) plus a payment of 1 DKK/KWH (\$0.20 USD / KWH) when called. Elkraft signed 18 contracts of in total 31 MW emergency power and 3 MW consumption. The total potential for emergency power in eastern Denmark has been estimated to approx. 100 MW (including only plant larger than 250 kVA). Of this potential, it is estimated that one third could be synchronized to the grid without major investments. A large share of the estimated total potential has been activated by the activity. The estimated potential for flexible demand is 155 MW

FINLAND:

Finland has several different types of demand side efforts in place. For example, TOU rates are widely used which has generally caused a shift of electric heating to off peak hours. In addition, many utilities have used direct load control of electric heating for many years, though its use has declined since the introduction of retail liberalization.

A few more recent examples of DR activity are:

- There is about 1000 MW of industrial load shedding that participates in Fingrid's ancillary service market. These are ten year agreements (2005-2015) designed to provide capacity as new generation plants are being built (e.g. the next nuclear plant is expected to go on line in 2009).
- Fingrid allows aggregated loads to bid in 10 MW blocks into the regulating (balancing) power market. However, consumers are not taking advantage of this opportunity.